

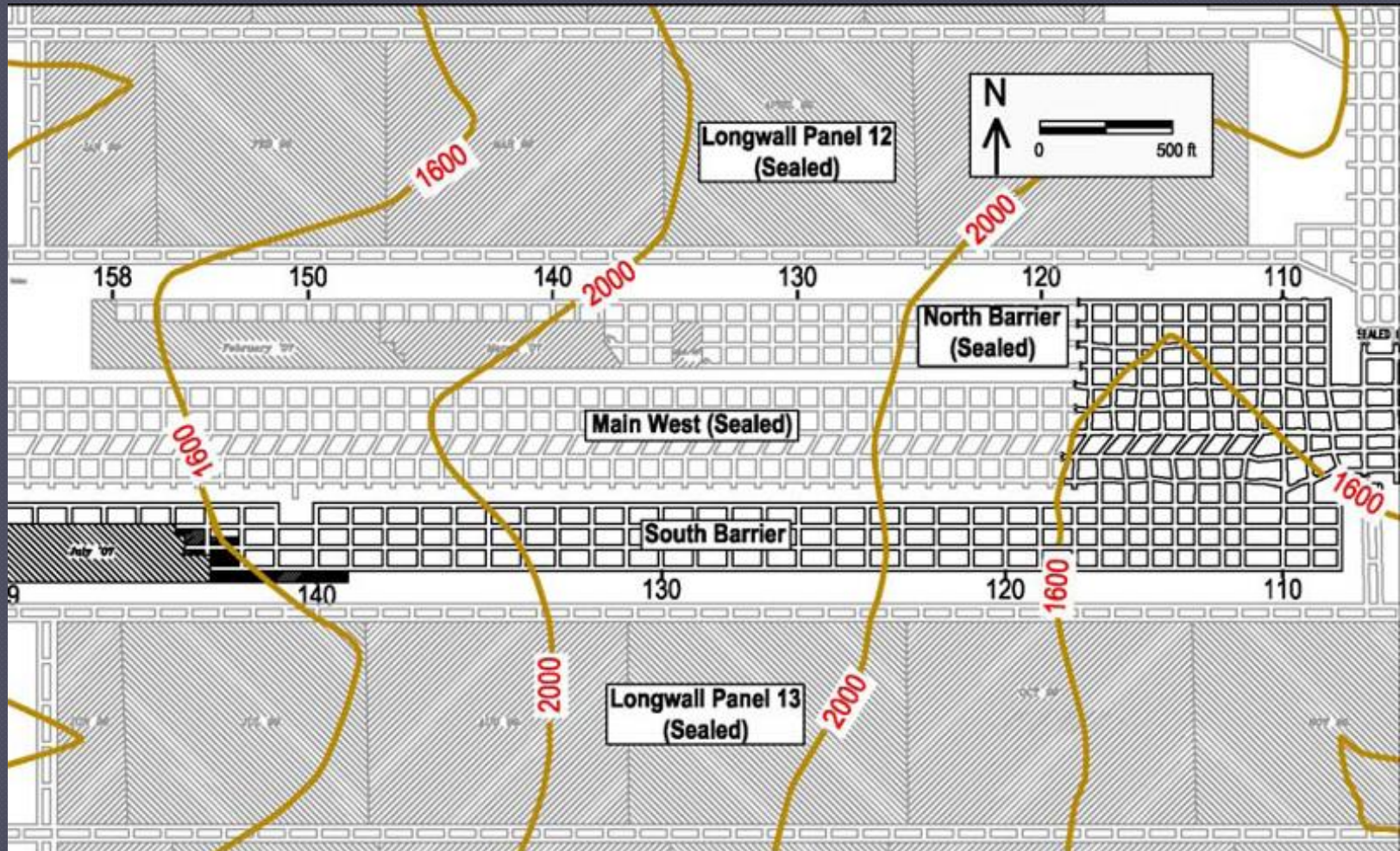
MSHA HANDBOOK SERIES

ROOF CONTROL PLAN APPROVAL AND REVIEW PROCEDURES

CRANDALL CANYON MINE DISASTER



Flawed pillar design resulted in mine collapse and nine deaths



U.S. Department of Labor
Office of Inspector General—Office of Audit

**MINE SAFETY AND HEALTH
ADMINISTRATION**



**MSHA COULD NOT SHOW IT MADE THE RIGHT
DECISION IN APPROVING THE ROOF CONTROL
PLAN AT CRANDALL CANYON MINE**

Date: March 31, 2008
Report Number: 05-08-003-06-001

2008 OIG REPORT: RECOMMENDATIONS

- Develop a rigorous, standard and transparent process to be used by Districts in evaluating Roof Control Plans.
- Establish explicit criteria and guidance for assessing the quality of, and potential safety risk associated with, proposed plans.
- Require documentation of how Districts reach their conclusion that approved plans will provide effective roof control.

**Internal Review of MSHA's
Actions at the Upper Big Branch Mine-South
Performance Coal Company
Montcoal, Raleigh County, West Virginia**



U.S. Department of Labor
Mine Safety and Health Administration
Program Evaluation and Information Resources

March 6, 2012

UBB INTERNAL REVIEW

“The Administrator should direct that a Roof Control Plan Approval handbook be developed to consolidate the numerous PILs, PIBs, and CMS&H memoranda. This will provide plan reviewers with a discrete set of guidelines and instructions for evaluating and processing roof control plans.”

U.S. Department of Labor
Office of Inspector General—Office of Audit

**MINE SAFETY AND HEALTH
ADMINISTRATION**



**MSHA HAS IMPROVED ITS ROOF CONTROL
PLAN REVIEW AND MONITORING PROCESS BUT
COULD DO MORE**

Date Issued: March 29, 2013
Report Number: 05-13-002-06-001

IG REVIEW

- ◉ Districts still operated under incomplete Roof Control Plan Standard Operating Procedures.
- ◉ MSHA has not updated the Program Policy Manual (Manual) or developed any other comprehensive roof control handbook. As a result, CMS&H Districts do not have access to a centralized repository from which to accurately update their roof control plan SOPs.

MSHA Handbook Series



U.S. Department of Labor
Mine Safety and Health Administration
Coal Mine Safety and Health

December 2013

Handbook Number PH13-V-4

ROOF CONTROL PLAN APPROVAL AND REVIEW PROCEDURES

PREFACE

This handbook establishes guidelines and procedures for CMS&H personnel to follow when evaluating and processing roof control plans and/or roof control plan revisions. The guidelines and instructions in this handbook address procedural, administrative, and technical aspects of plan reviews, and are intended to serve as organizational and technical aids for roof control Plan Reviewers. Guidance for conducting inspection activity can be found in the CMS&H General Inspection Procedures Handbook.

ROOF CONTROL HANDBOOK

CONTAINS SIX CHAPTERES AND APPENDICES

- Chapter 1–Introduction
 - A. Purpose and General Requirements of Roof Control Plans
 - B. Authority
 - C. Responsibility
- Chapter 2–Management System Controls
- Chapter 3–Plan Reviews
- Chapter 4–Reviews of Plan Revisions
- Chapter 5–Quarterly Reviews
- Chapter 6–Six Month Reviews
- Appendices

APPENDICES TO HANDBOOK

- Incorporates and supersedes PIBs, PILs, PPLs, and HQ memos for policy guidance.
- Provide background technical information for all aspects of plan evaluation.

ROOF CONTROL HANDBOOK

- Chapter 1—Introduction
 - A. Purpose and General Requirements of Roof Control Plans
 - B. Authority
 - C. Responsibility



Chapter 1



ROOF CONTROL PLANS: GENERAL REQUIREMENTS

A sound roof control plan is essential for controlling the roof, face and ribs, including coal or rock bursts in underground coal mines. Each mine operator is required by 30 CFR 75.220 (a) (1) to develop and follow a roof control plan, approved by the District Manager, that is suitable to the prevailing geological conditions and the mining system to be used at the mine.

ROOF CONTROL PLANS: GENERAL REQUIREMENTS

A good roof control plan includes information and criteria that supervisors and miners need to be aware of to maintain effective roof control in their working environment.

ROOF CONTROL HANDBOOK

- Chapter 2—Management System Controls



Chapter 2



MANAGEMENT SYSTEM CONTROLS

- A proposed roof control plan, and any revisions to the plan, must be submitted in writing to the District Manager.
- Each MSHA District Office should use the Mine Plan Approval System (MPAS) to track an operator's response to a District Manager's request for plan revisions, and to identify overdue responses.
- A plan request should be handled efficiently, with an effort to complete the process in a time period of 45 calendar days.

MANAGEMENT SYSTEM CONTROLS

When MSHA formally requests additional information from a mine operator:

- If the operator fails to respond to this request, MSHA should ask the operator to withdraw the plan and the withdrawal action should be documented in the MPAS.
- If the operator refuses or does not respond in a timely manner, the plan should be disapproved and a letter sent to the mine operator explaining the rationale for the decision.

MANAGEMENT SYSTEM CONTROLS

The progress of the plan and/or revision through the approval process should be coordinated by the ADM following the district's Standard Operating Procedure (SOP) and Plan Transmittal Sheet. A sample SOP, together with the Plan Transmittal Sheet, is provided in Appendix A. The District Roof Control SOPs should not contain any policies or repeat the review procedures included in the Handbook, but should instead reference the Handbook.

ROOF CONTROL PLAN REVIEW FLOW

1. The Roof Control Supervisor assigns the plan to the Plan Reviewer.
2. The Reviewer conducts a thorough review in accordance with the MSHA Roof Control Plan Approval and Review Handbook.
3. The Reviewer uses the Plan Transmittal Sheet to document the plan coordination and review, together with his or her recommendations and any relevant comments, and then returns the review to the Roof Control Supervisor.

ROOF CONTROL PLAN REVIEW FLOW

4. The Roof Control Supervisor documents his or her recommendations, along with any relevant comments, and then forwards the plan to the ADM.
5. The ADM documents his or her recommendations, along with any relevant comments, on the Plan Transmittal Sheet, and forwards the plan to the District Manager.

DISTRICT MANAGER'S DECISION :

1. If the proposed plan or revision is approved, written notification is sent to the operator.
2. If the DM determines that the proposed plan or revision is not suitable to the prevailing geological conditions or the system of mining to be used at the mine, written notification is sent to the operator that (1) addresses the deficiencies of the proposed plan or revision for which approval is denied; (2) provides the operator an opportunity to discuss with the District Manager the problems identified and potential solutions; and (3) sets a reasonable time for the operator to submit any revised plan provisions, if needed

MANAGEMENT SYSTEM CONTROLS

One copy of the completed approved plan and/or revision (with approval letter) is sent to the MSHA Coal Mine Safety and Health **Field Office** and placed in the Uniform Mine File. This copy should be sent at the same time that the approval letter is sent to the operator. If appropriate, copies of the approved plan (with approval letter) should also be sent to the appropriate **state agency** and the **miners' representative**. Copies of denied or withdrawn plans are not required to be sent to the field office. If a plan is withdrawn by the operator, that fact should be documented in the MPAS.

MANAGEMENT SYSTEM CONTROLS: DOCUMENTATION

One copy of the completed approved plan with the approval letter should be retained at the District Office. This file should also include all documentation of the plan reviews and evaluations (including MSHA Form 2000-204 (if applicable), checklists, drawings, sketches, correspondence between the operators and Plan Reviewers, etc.) that support the decision to approve the plan. This file should be retained by the District for at least as long as the plan is in effect. Documentation for plans for which approval is denied or for plans that are withdrawn by the operator is not required to be retained.

ROOF CONTROL HANDBOOK

- Chapter 3—Plan Reviews



Chapter 3



PLAN REVIEWS

While responding promptly to each request for a roof control plan approval is important, review quality and thoroughness are essential. This Handbook provides guidance for assessing the quality of, and potential safety risk associated with, proposed plans. Districts are required to document the basis for their conclusion that approved plans will provide effective roof control.

PLAN REVIEWS: INITIAL STEPS

1. In considering whether to approve a proposed plan, the Reviewer must determine whether the plan is consistent with all relevant, mandatory provisions of the Mine Act and MSHA's standards and regulations.
2. If the operator is resubmitting a previously approved plan, then the Reviewer should ensure that the new plan does not reduce the level of protection provided to the miners. Any significant additions, deletions, or changes must be noted.
3. The Reviewer determines that all required information has been submitted.

PLAN REVIEWS: COMMUNICATION

4. The Reviewer contacts the assigned CMI and/or Field Office Supervisor to solicit comments on the appropriateness of the plan.
5. The Reviewer considers written comments from the representatives of miners.
6. If the mine operator submits written correspondence (including e-mail), it should be printed and retained with the official file. Significant interactions, such as meetings with the operators, should also be documented.

PLAN REVIEWS: PAST EXPERIENCE

7. If the plan under review is for an existing mine, the Reviewer checks the mine files for information relating to plan adequacy including roof fall history, injury experience, accident reports, citations, and plan review (MSHA Form 2000-204) forms from the mine. (Appendix I)

PLAN REVIEWS: TECHNICAL SUPPORT

8. Based on the type of plan submittal and the complexity of the mine, the Reviewer determines whether MSHA's Directorate of Technical Support (Technical Support) Roof Control Division's assistance with the review of the plan is warranted. (Appendix C)

PLAN REVIEWS: PILLAR STABILITY ANALYSES

9. If Technical Support's assistance is not requested, then the Reviewer uses ARMPS, ALPS, AMSS, or other applicable software for pillar stability analysis. Critical input parameters and calculations sent by an operator are verified by the Reviewer. If necessary, the operator should furnish a current 30 CFR 75.1200 mine map with depth of cover contours. Appendix D contains guidance for conducting pillar stability analyses.

If MSHA's evaluation shows that the stability factors calculated do not meet or exceed the design criteria in the appropriate software program (see Appendix E or F) then the proposed roof control plan is forwarded to Technical Support for assistance.

PLAN REVIEWS: OTHER PLAN APPROVAL GROUPS

10. The Reviewer communicates with other plan approval groups concerning common issues in a plan. The Reviewer consults with the Ventilation Group and reviews overlay and underlay maps of coal mine workings above and below projected mining. The Reviewer should pay particular attention to evaluating the possible presence of impounded water above projected mining. If the Reviewer determines that such impoundments may exist, a permit may be required in accordance with 30 CFR 75.1716-2.

PLAN REVIEWS: CHECKLISTS

11. MSHA has created roof control plan checklists to assist the Reviewer in reviewing plans, and to document the rationale supporting plan approvals. MSHA's mandatory standards, interpretive guidance, safety precautions and best practices are included in the checklists.

PLAN REVIEWS: CHECKLISTS

The checklists are not intended to be a “one size fits all” approach because roof control plans are developed and revised on a mine-specific basis considering the prevailing geological conditions and the mining system to be used at the mine. Consequently, not all items on the checklists are always applicable for each and every mine. Other Appendices provide additional information that can aid the Reviewer in determining which checklist items may be appropriate on a mine-by-mine basis.

PLAN REVIEWS: INSPECTIONS

12. If applicable, a limited inspection of the mine is conducted to evaluate the suitability of the plan to the roof and rib conditions. The results of the evaluation should be discussed with the operator and any miners' representatives. Guidance for conducting underground inspections for a roof control plan approval or review is contained in Appendix J.

PLAN REVIEWS: OTHER

13. The Roof Control Group determines whether an on-site evaluation should be conducted at a new highwall and/or pre-existing highwall that is developed as a portal area for new underground mine openings.

14. The Reviewer should evaluate all plan requests for extended cuts in accordance with MSHA PIL “Procedures for Evaluation of Requests to Make Extended Cuts With Remote Controlled Continuous Mining Machines.”

ROOF CONTROL HANDBOOK

- Chapter 4— Reviews of Plan Revisions



Chapter 4



REVIEWS OF PLAN REVISIONS

The procedures for reviewing plan revisions (addendums) are similar to those for reviewing plans. The key difference is that most proposed plan revisions only address specific portions of the approved plan. **Therefore, some steps may be unnecessary in some situations.** In particular, depending on the nature of the revision only some of the checklists may be appropriate. The Roof Control Supervisor should make the determination as to which checklists should be used for each revision.

REVIEWS OF PLAN REVISIONS

A revision of the roof control plan is not necessarily required each time that equipment is added. However, a revision is necessary when there is **a significant change to the mining system**, such as:

- ◉ A new roof bolter with a different roof bolt installation pattern or a different type of Automated Temporary Roof Support (ATRS) system,
- ◉ New mining equipment that requires a change to the depth of an extended cut or pillar lift depth (e.g., center drive shuttle car or continuous mining machine (CM) with deck),
- ◉ A change from shuttle cars to continuous haulage, or
- ◉ Adding a roof bolter with rib bolting capability.

REVIEWS OF PLAN REVISIONS

In accordance with 30 CFR 75.220 (a) (2), when revisions are proposed, only the revised pages need to be submitted unless otherwise specified by the District Manager. **When the number of revisions to an approved plan makes it difficult to determine the operative provisions of the plan**, the District Manager should notify the operator in writing to submit a revised plan that clearly sets forth all previously approved revisions and any proposed revisions, and deletes those provisions that are no longer applicable.

ROOF CONTROL HANDBOOK

- Chapter 5– Quarterly Reviews



Chapter 5



QUARTERLY REVIEWS

Reviews of the roof control plans should be completed every quarter by a CMI to ensure that the plans are suitable to current geological conditions and mining systems in the mine, using MSHA Form 2000-204. If the CMI indicates a deficiency, then the form should be sent to the Roof Control Supervisor for evaluation.

QUARTERLY REVIEWS

After receiving the MSHA Form 2000-204, the Roof Control Supervisor should determine if a roof control plan deficiency exists. If so, the Roof Control Supervisor should require the plan to be revised to address the deficiency.

The Roof Control Supervisor should notify the CMI who identified the deficiency of the corrective action taken and of the applicable plan changes. If the Roof Control supervisor determines that no deficiency exists, he or she should notify the CMI and Field Office Supervisor.

ROOF CONTROL HANDBOOK

- Chapter 6—Six Month Reviews



Chapter 6



SIX-MONTH REVIEWS

In accordance with 30 CFR 75.223, the roof control plan must be reviewed every six months by an Authorized Representative of the Secretary (AR). This requirement ensures that approved plans are still appropriate for the mine and continue to provide an adequate system of roof control and are revised as conditions warrant.

SIX-MONTH REVIEWS

The regular CMI may conduct the six month reviews of the less complex or typical plans in the District with assistance provided by the Roof Control Specialist as needed. A Roof Control Specialist should conduct the six month reviews of the more complex or non-typical plans in the District.

SIX-MONTH REVIEWS: PRELIMINARY

The assigned Reviewer should follow these steps:

- Review the detailed historical record of safety conditions at the mine, including previous MSHA Form 2000-204 comments. (see Appendix I).
- Communicate with other plan approval groups concerning common issues in a plan.
- Send complex or non-typical pillar designs to Technical Support for assistance. (See Appendix C)

SIX-MONTH REVIEWS: PILLAR STABILITY ANALYSIS

When a pillar design is not sent to Tech Support for assistance, the reviewer evaluates mining projections using ARMPS, ALPS, AMSS, or other applicable software for pillar stability analysis. If MSHA conducted an analysis concurrently with the review of the ventilation plan at any time during the six months prior to the roof control plan review, then the Plan Reviewer may make the determination that it is not necessary to conduct another analysis, but in every case the results of the pillar stability analysis should be documented. (See Appendix D)

SIX-MONTH REVIEWS: INSPECTIONS

If necessary, a limited inspection of the mine is conducted to evaluate the roof and rib conditions. The results of the evaluation should be discussed with the operator and any miners' representatives. The Roof Control Group should contact the assigned CMI and/or Field Office Supervisor to solicit comments on the appropriateness of the plan.

SIX-MONTH REVIEWS: INSPECTIONS

Following the inspection, a Plan Review form (MSHA Form 2000-204) should be completed by the Reviewer. A brief narrative describing the adequacy or any deficiencies of the plan should be included. If the MSHA Form 2000-204 indicates a deficiency or needed change, the form should be sent to the District Roof Control Supervisor for evaluation.

SIX-MONTH REVIEWS: SCHEDULE

The date on which the initial plan is approved becomes the date of record for that plan. The first six month review must be completed within six months of the date of record. All subsequent six month reviews are completed within six months of the date of the **last completed review**. If the operator revises and resubmits a previously approved plan, and the resubmittal is approved, then the new approval date becomes the date of record for the plan.

APPENDIX A: SAMPLE DISTRICT SOP



APPENDIX A: SAMPLE DISTRICT SOP

The progress of the plan and/or revision through the approval process should be coordinated by the ADM following the district's Standard Operating Procedure (SOP) and Plan Transmittal Sheet. A sample SOP, together with the Plan Transmittal Sheet, is provided in Appendix A. **The District Roof Control SOPs should not contain any policies, or repeat the review procedures included in the Handbook, but should instead reference the Handbook.**

ROOF CONTROL SAMPLE DISTRICT SOP

- ◉ When any roof control plan and/or revision (addendum) of a roof control plan is received in the District Office, (List title of person in the district who will complete this task) will log it into the Mine Plan Approval System (MPAS) and assign a tracking number to the plan.
- ◉ (List title of person in the district who will complete this task) will attach a Plan Transmittal Sheet to the plan and complete all applicable sections.
- ◉ (List title of person in the district who will complete this task) forwards the original plan and Plan Transmittal Sheet to the Roof Control Supervisor.

DISTRICT X PLAN TRANSMITTAL SHEET

SECTION A: GENERAL INFORMATION

DATE RECEIVED FROM: ☐ OPERATOR ☐ MAIL ☐ OTHER _____ / _____ / _____ RECEIVED BY: _____

MSIS Plan Tracking No. _____

PLAN TYPE: _____

COMPANY NAME: _____

MINE NAME: _____ I.D. NO. _____

FIELD OFFICE: ☐ XX ☐ XX ☐ XX ☐ XX ☐ XX ☐ XX

PLAN SUMMARY / COMMENTS: _____

—

SECTION B: ON-SITE REVIEW (IF APPLICABLE) AND MINER'S REPRESENTATIVE'S COMMENTS

ON-SITE REVIEW CONDUCTED: ☐ YES, ☐ NO

DATE OF REVIEW: _____

COMMENTS: _____

- COMMENTS RECEIVED FROM MINER'S REPRESENTATIVE? ☐ YES ☐ NO ☐ NO REPRESENTATIVE (See reverse)

QUESTIONS?

Please submit follow-up questions, in writing, within one week, to either:

- Christopher Mark
- Johnny Calhoun

A Q&A document will be developed and provided to each inspector and specialist. Additional training will be provided to the Roof Control Specialists during the annual specialists' seminar.